USAID's Water and Energy Nexus Project, Phase II
Quarterly Report, December 2005

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1. Background

The Water and Energy Nexus Project (WENEXA) Project falls under the Indo-US Bilateral Agreement entitled Energy Conservation and Commercialization between the Governments of India and the United States. The Ministry of Power is the authorized nodal agency representing the Government of India within the context of this agreement. The agreement finances various energy conservation initiatives and also includes the USAID Distribution Reform Upgrade Management (DRUM) program that comprises: 1) DRUM technical assistance and demonstration projects; 2) Training Initiative; 3) Rural electrification technical assistance through an agreement with the US Department of Agriculture's Rural Utility Service (RUS); and, 4) Water and Energy Nexus Activity. The two Governments have organized a DRUM Project Advisory Committee (PAC) to ensure joint coordination of this initiative.

The activities under this project support USAID's Strategic Objective (SO) 16. Improved Access to Clean Energy and Water in Selected States. Performance indicators associated with this SO include:

1. Number of men and women that have access to improved power supply.[1]
2. Number of men and women with access to sustainable water supply.
3. Number of tons of CO2 avoided.[2]

WENEXA II responds to IR. 16.2

IR 16.2: Improved groundwater management in selected states:

Adoption of energy efficient pumps.[3]

Number of hectares of cropland under improved irrigation techniques.[4]

The WENEXA Project includes the following components and tasks.

Component A: Policy Dialogue

Task 1.	Support Development of Energy and Water Co-Management Framework
Task 2.	Provision of Central and State Level Programmatic and Institutional Support
Task 3	Support Institutional Arrangements and Capacity Building for Sustainable Water Resources Management in Target Areas

[1] Improved power supply is defined by the number of new connections and the increase in hours of electricity supply per day within a defined geographic area.

[2] Standard equations will be used to estimate the amount of CO2 avoided through adoption of energy efficient technologies and practices.

[3] Use of energy efficient pumps is a key measure for the adoption of technology for improved water-energy management.

[4] Adoption of improved irrigation techniques (such as drip or sprinkle) is a key measure for water end-use efficiency.

Component B: Sector Reforms—Site Based Activities

Task 4.	Provide Site Based Activities to Enhance Commercial Power Distribution and Sustainable Water Management in Agriculture
Task 5.	Support Basin Level Hydrological Information Collection and Analysis in Target Areas
Task 6.	Provide Site Based Support To Improve Urban Energy/Water Accessibility, delivery, efficient use, and waste management
Task 7.	Support to Improve Water Service Delivery, Reliability and Pollution Reduction in the Industrial Sector

Component C: Customer Service and User Group Participation

Task 8.	Develop and Implement a Communication Strategy with the Engagement of Civil Society/Industrial groups to extend and promote water energy concepts and technologies
Task 9.	Design of Participatory Models to Improve Local Ownership and Management of Rural Power Distribution
Task 10.	Promote Sustainable Water Resources Management Through Grass Roots Institutions

2. Task-Specific Activity Highlights

During the October –December Quarter, the Water and Energy Nexus Project focused on the following activity areas:

2.1 Site Based Activity for Groundwater Irrigated Agriculture

- Reconciliation of data from the pumpset inventory, on farm survey, and water and energy user survey
- Development of Project Site area mapping
- Development of implementation approaches for Detail Project Reports for improved irrigation and energy efficiency
- Ascertaining results and lessons learned from pumpset replacement pilot
- Training and outreach

2.2 Site Based Activity for Water Reuse in the Municipal Sector

- Completion of options survey for potential users of recycled water from Nagpur Municipal Corporation
- Stakeholder presentation
- Selection of Project for Detailed Project Report Development
- Release of Policy Statement for Water Reuse in Maharashtra
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2.3 Andhra Pradesh Policy Activities

- Technical review sessions to review current Government programs and initiatives
- Institutional mapping of APWLTA

2.4 Task 1. Support Development of Energy and Water Co-Management Framework

To be based on results of site based initiatives.

2.5 *Task 2. Provision of Central and State Level Programmatic and Institutional Support*

2.5.1 Meeting of the Government of Maharashtra's Standing Committee on Water—Release of Policy Statement on Water Reuse

On December 14, 2005, the Government of Maharashtra's Standing Committee on Water, including membership from the Department of Urban Development, Water Supply and Sanitation Department, Environment Department, and Water Resources Department, convened. During the meeting, the Committee released a statement of support for water recycling and reuse to meet growing water demands.

2.5.2 Technical Coordination Working Group, AP WENEXA Project Steering Committee

During the quarter two Andhra Pradesh WENEXA Project Technical Coordination Working Groups were conducted. On October 27, 2005, the meeting was hosted by the Groundwater Department. Presentations included: 1) status of AP Water Policy and AP Groundwater status, 2) surface water augmentation of groundwater resources and 3) lessons learned from the Maheshwaram intervention.

During the November 30, 2006 meeting presentations, were made on: 1) AP Rural Development Programs related to water and land management; 2) Programs and policies of the agriculture department for water conservations; 3) ORP's research initiatives for water conservation; 4) WENEXA Lessons Learned; and 5) Progress on the APWLTA Institutional Mapping Report.

2.6 *Task 3. Support Institutional Arrangements and Capacity Building for Sustainable Water Resources Management in Target Areas*

Dr. Srinivas Prasad (left), Director of the AP Groundwater Department and Chairman of the AP WENEXA Technical

- The CII/GBC National Water Summit was held on November 26, 2005. The WENEXA Project contributed to the first reporting session by financing a presentation by Dr. Bahman Sheikh on water reuse in watershed management.

2.7 *Task 4. Provide Site Based Activities to Enhance Commercial Power Distribution and Sustainable Water Management in Agriculture*

2.7.1 Pumpset Replacement Pilot Verification Trip

On November 17, 2006, the WENEXA team visited the farm sites where energy efficiency pumpsets were installed in exchange for shifting at least one acre of flood irrigated area to drip irrigation systems. The visit revealed that most of the pumpset farmers had installed converters to enable single phase pumping. Although this is not an ideal situation, it is a typical practice in the Project site area. We believe that

improved network voltage and rural load management scheme that would provide farmers with high quality stable power supplies would remedy their need to install converters to their pumping systems. We also found on the visit that all of the farmers had complied with their commitment to transfer one acre of flood to drip irrigation. Farmers were generally enthusiastic about drip technology and the prospects it offered for allowing them to meet their crop water needs. The team also found, however, that several farmers were concerned that lower capacity pumps that were installed might not be adequate. However, the pumpset dealer assured them that the discharge rates were the same as with their old pumpsets.

2.7.2 Technical Review Meetings Doddaballapur

A series of technical meetings between IIEC, UASB, IYD and PA were conducted throughout the quarter. With the pumpset inventory, on farm survey, and the water and energy user survey completed there were three separate databases that needed to be reconciled and linked. Although the pumpset inventory stands alone as a single analysis, the IYD water and energy use survey and secondary data from revenue departments were used as the basis for establishing the cropping pattern in the Project site area. There was a considerable need for clarification on the sources and quality of data used for the irrigation efficiency detailed project report. The team also discussed implementation strategies for the irrigation and pumpset efficiency programs. List of farmers belonging to certain groups were developed from IYD's database. This data will allow the project to target its programs toward specific farmer groups and identify specific farmers belonging to each of the groups.

2.7.3 Draft Detailed Project Reports and Implementation for Pumpset Efficiency

Meetings with BESCOM, Sericulture Department, Horticulture Department, Department of Watersheds, and Department of Mines and Geology were conducted during November to follow up on various aspects of DPR implementation.

- **Irrigation efficiency DPR Implementation.** A list of farmers that had an interest in self -financing drip systems were developed and forwarded to the Sericulture and Horticultural Departments to enable them to target subsidy funds. 77 mulberry farmers willing to shift 117 acres from flood to drip irrigation were identified. 44 farmers producing a range of horticultural crops willing to shift 83 acres from flood to drip were identified. These farmers will be the focus of FY 06 efforts to improve irrigation in the project area.

- **Pumpset Efficiency Improvement DPR Implementation.** A series of discussions with BESCOM on a third party financing model for pumpset replacement were held. As a result of meetings with the Chief engineering a spreadsheet that detailed specific costs, benefits, and benefits sharing arrangements was developed.

2.7.4 Watershed Program

- A series of meetings were held with the Watershed Department and IYD to determine the focus of watershed planning efforts that will be conducted in the Project area. During discussions, it was found that watershed plans have been developed by the respective Gram Panchayats for Heggedehalli and Tubagere. However, the planning process has not yet been conducted for Melekote. The project will undertake discussions with the Melekote Gram Panchayat to support its planning process.

2.7.5 Report on Women's Self Help Groups in the Project Site Area

- During the Quarter, IYD staff completed a report on Women's Self Help Groups (SHGs) operating in the Project Area. The report found 85 SHG's operating in the Project area, with 50% of the groups were formed under the auspices of the Women and Child Development Department and approximately 40% of the groups were formed under the auspices of milk cooperatives and farmer development groups. Approximately 14% of the operational borewells located in the project area are owned and operated by households of SHG members. These wells irrigate approximately 224 acres of mulberry and other horticultural crops.

  Most SHGs hold weekly meetings where members contribute an average of Rs. 50 towards the savings program. 12 of the groups operate lending programs for loans to members in the range of Rs. 25,000 to 180,000. The rate of recovery for loans taken from SHG's is nearly 100%. Several of the groups have arranged credit lines from the Corporation Bank of Melekote. The loan recovery rate for these loans is in the 80% range. To date, SHG's have not taken or issued loans to support WENEXA type interventions. However, given the large percentage of borewell

farm households located in the Project site area that also have a member of a SHG, there seems to be opportunity for promoting this type of loan among SHGs.

2.8 Task 5. Support Basin Level Hydrological Information Collection and Analysis in Target Areas

- The Project obtained baseline watershed maps from the Watershed Department to begin the mapping exercise to support the water balance analysis.

2.9 Task 6. Provide Site Based Support To Improve Urban Energy/Water Accessibility, delivery, efficient use, and waste management

- **Water Reuse Exposure Trip to New Delhi**-- Based on meetings held with Messrs. Mehta and Bapat of MSPGCL and with NMC's management in Mumbai and Nagpur during September, a study tour to observe water reuse at a power plant location in New Delhi was conducted on October 6-7. The group visited the Ritali STP and the Pragati Power Co. Ltd., New Delhi. This trip was designed to allow MSPGCL staff to interact with Sewerage Treatment Plant operators to discuss the following issues: 1) water quality and quantities; 2) O&M and operator arrangements; 3) STP design and construction issues; 4) commercial issues; and 5) regulatory framework. Participants of the trip included Mr. Pammpanwar, Dy. Chief Engineer (Civil), and Mr. Nafade, Executive Engineer (Civil), *of Mahagenco (MSEB,)* Mr. Chaure, DGM, and Mr. Agrawal, Sr. Manager of Degremont India Limited; and, Mr. Arun Kumar, PA Consulting, Inc. Mr. Dinesh Rathi, DRA, Nagpur of the WENEXA team.

The meetings served an important role in terms of establishing first hand, the technical and commercial practice of large scale water reuse between STP's and power plants. Mr. Pammpanwar and Nafade were convinced that reclaimed water is a viable alternative for MSPGCL's existing and future plants, and probably the only choice for the 500 MW Chandrapur power plant expansion.

- **October 17, 2006 Stakeholder's Meeting to Review Water Reuse Options Report Findings**

The WENEXA Project has recently undertaken a study of the potential water reuse options, identifying the most viable users of recycled municipal wastewater for Nagpur Municipality, Maharashtra. The study identified 30 most likely bulk water users. It also identified the Maharashtra State Electricity Board, which wants to expand generation capacity in Nagpur, and the new international cargo terminal that is planned for Nagpur, as major potential new users of recycled water.

On October 17, 2005, the WENEXA Project and the Nagpur Municipal Corporation (NMC) held a workshop to discuss reuse options with potential consumers. More than 60 people attended, including the Principal Secretary Urban Development/Maharashtra, the Nagpur Municipal Commissioner, Chairman of the Nagpur Improvement Trust, Chief Engineer of MSPGC, Chief General manager of the new cargo terminal (MIHAN) project, South Central Railway Divisional Manager.

The priority for water reuse identified among this group was the use of recycled water to expand the State's power generation capacity. This area was viewed by many as a means for solving limits on expansion capacity in water scarce regions. Following the meeting, an MOU was drafted between MSEB and NMC to facilitate the arrangement for construction of NMC's North zone treatment plant to support MSEB's planned 1000 MW power plant expansion in Nagpur.

- **November 22 Technical Review Meeting**

The first technical review meeting for the Nagpur Municipal Site Based Activity was conducted on November 22. The meeting was quite informative about the progress that had been made toward selecting user options for water reuse and toward selecting the project site for development of a Detailed Project Report.

- **November 23 Stakeholder Meeting and Field Visit**

On November 23, 2006, the WENEXA Project sponsored a stakeholder's workshop for the Nagpur Municipal Corporation, staff of the Bhandewadi Sewerage Treatment Plant, and staff of MAHAGENCO. The purpose of the meeting was to introduce water reuse in the international context through presentations by Dr. Bahman Sheikh. The meeting was followed with a discussion at the office of Mr. Lokesh Chandra, the NMC Municipal Commissioner and a site visit to the Bhandewadi Sewerage Treatment Plant.

2.10 Task 7. Support to Improve Water Service Delivery, Reliability and Pollution Reduction in the Industrial Sector

- From November 10-30, the Project initiated a strategy development for water reuse in the industrial/commercial sector for the Greater Hyderabad Metropolitan Area. This initiated strategy development along with an update of the water user options survey conducted during a SWAP study conducted under WENEXA I.

2.11 Task 8. Develop and Implement a Communication Strategy with the Engagement of Civil Society/Industrial groups to extend and promote water energy concepts and technologies

Activities to be initiated post DPR stage.

2.12 Task 9. Design of Participatory Models to Improve Local Ownership and Management of Rural Power Distribution

Activities to be initiated post DPR stage.

2.13 Task 10. Promote Sustainable Water Resources Management Through Grass Roots Institutions

2.13.1 Exposure and Training

On November 17, 2005, the WENEXA Program hosted participation of 90 farmers from the Agricultural site area in Doddaballapur in the University of Agricultural Sciences, Bangalore. This group comprised approximately 50% of the grape and mulberry growers cultivating these crops in the Project site area.

The Krishi Mela allowed introduction of the farmers to new technologies in crop cultivation and irrigation. Krishi Mela is a four-day conducted every year for the benefit of the farmers all over Karnataka. It is organized in joint collaboration with several government departments including Agriculture, Watershed, Sericulture, Horticulture, Animal Husbandry, Fishery, Forestry, etc. Farmers gain knowledge on several aspects of farming, livestock management, improved techniques of agriculture, improved and efficient farm equipments including pump sets and drip equipments, etc. Features of the Mela included demonstrations, display materials and exhibits, interactive discussions.

3. Program Plans for Upcoming Quarter

Agricultural Site Based Activity

- Financing mechanism for pumpset efficiency DPR
- Financing mechanism for irrigation efficiency DPR
- Initiate water balance analysis
- Design watershed planning approach
- Initiate design of communication and outreach strategy

Municipal Site Based Activity

- Finalize DPR
- Initiate technology demonstration pilot

AP WENEXA Policy Activity

- Finalize presentation series
- Draft recommendations on improvements in APWLTA for submission to AP WENEXA Project Steering Committee

Industrial Site Based Activity

- Completion of updated user options survey
- Initiate technology demonstration pilot